OHIO SEA GRANT AND STONE LABORATORY

Community Response to Coastal Storm Hazards: Analyzing Vulnerability & Resilience

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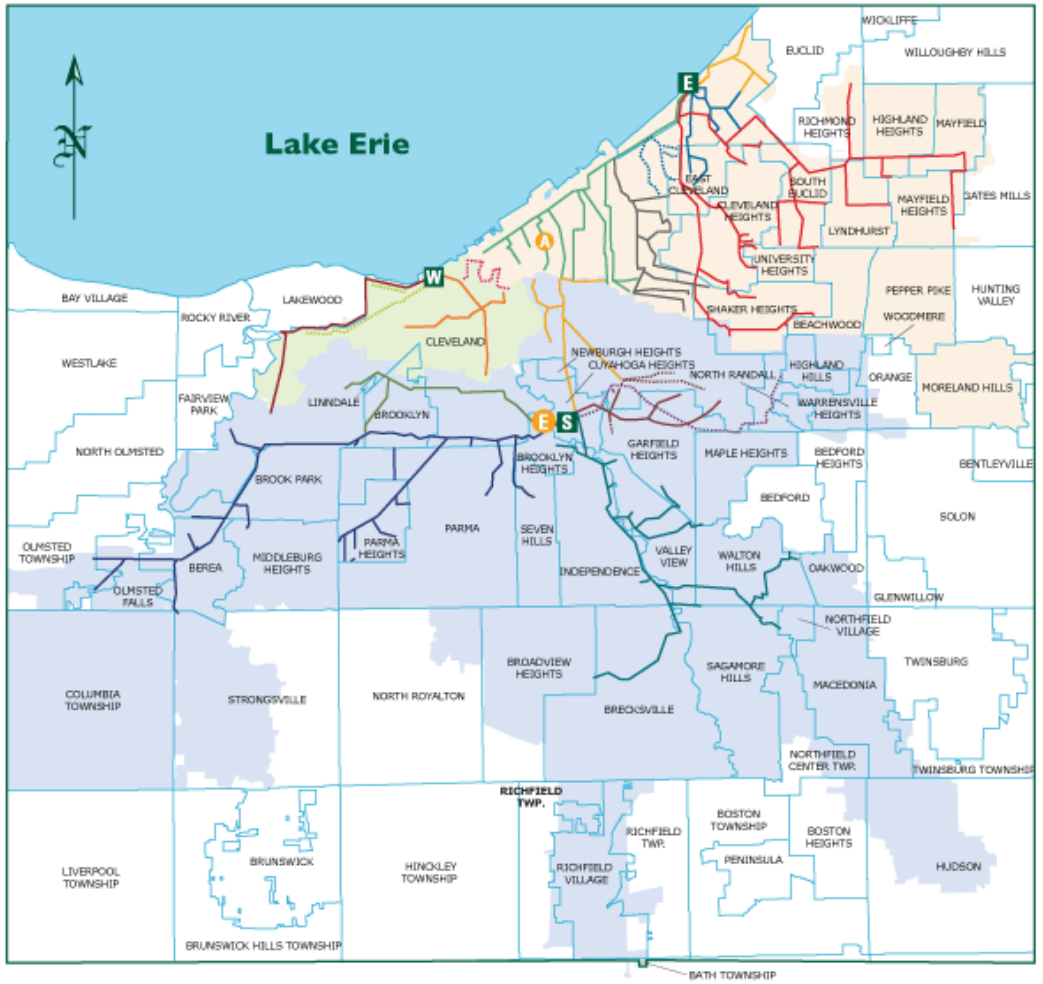
“Another way of looking at resilience is the ability not only to bounce back but also to ‘bounce forward’ – to recover and at the same time to enhance the capacities of the community or organization to better withstand future stresses.”

-After Sandy: Advancing Strategies for Long-Term Resilience & Adaptability, Urban Land Institute (ULI)

Photo credit: J. Cheston, OSU STEP Project

Why Research Storm Hazards in Northeast Ohio?

- Severe thunderstorms and flooding are most destructive natural hazards
- Nine of past 11 declarations of disaster
- Over $650 million in damages from 1950-2010



Credit: NEORSD

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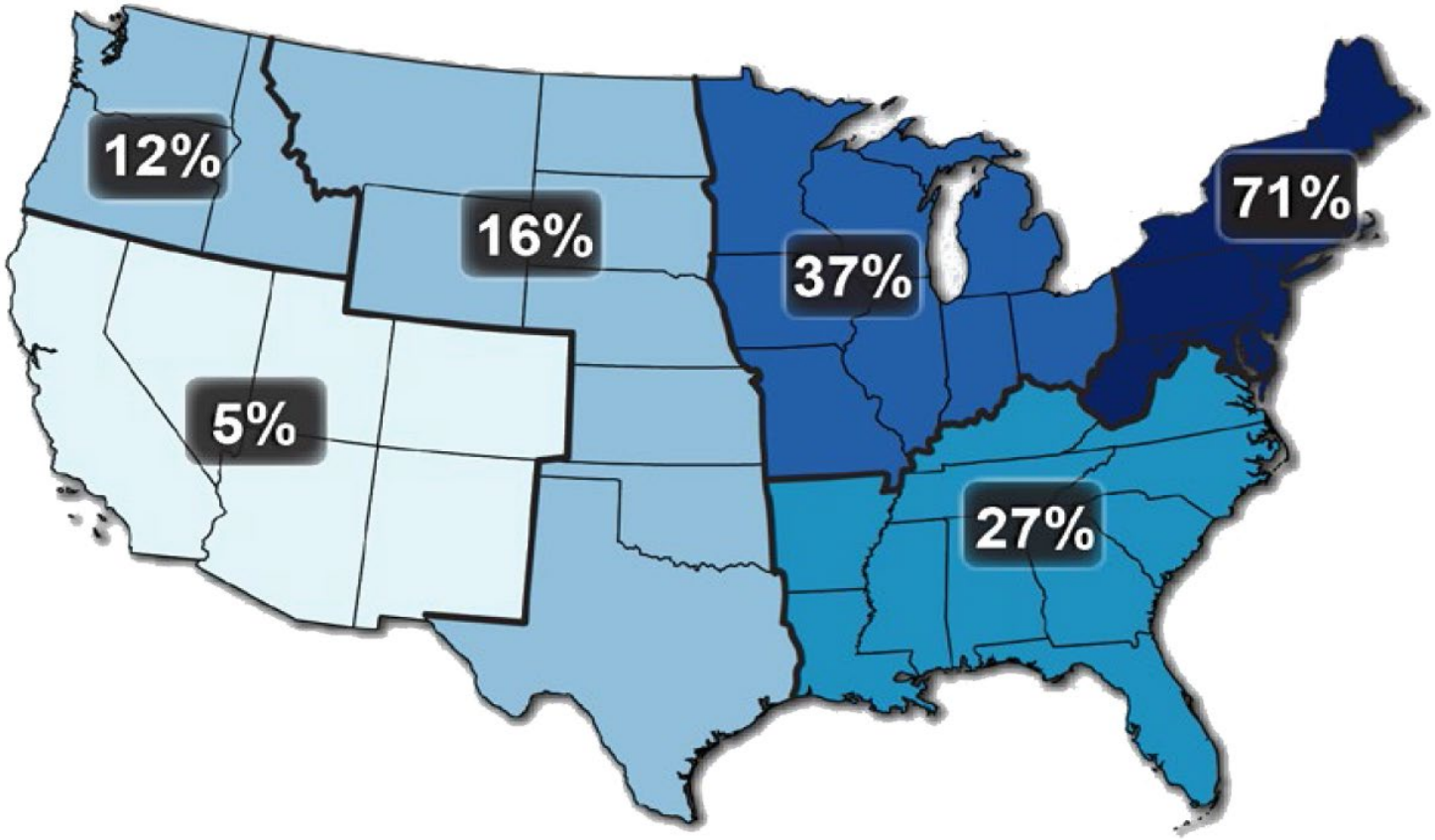
Observed Climate Data



The amount falling in the heaviest 1% of precipitation events increased by 37% in Ohio from 1958 to 2012.

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Following methodology from Groisman et al, 2005, updated.

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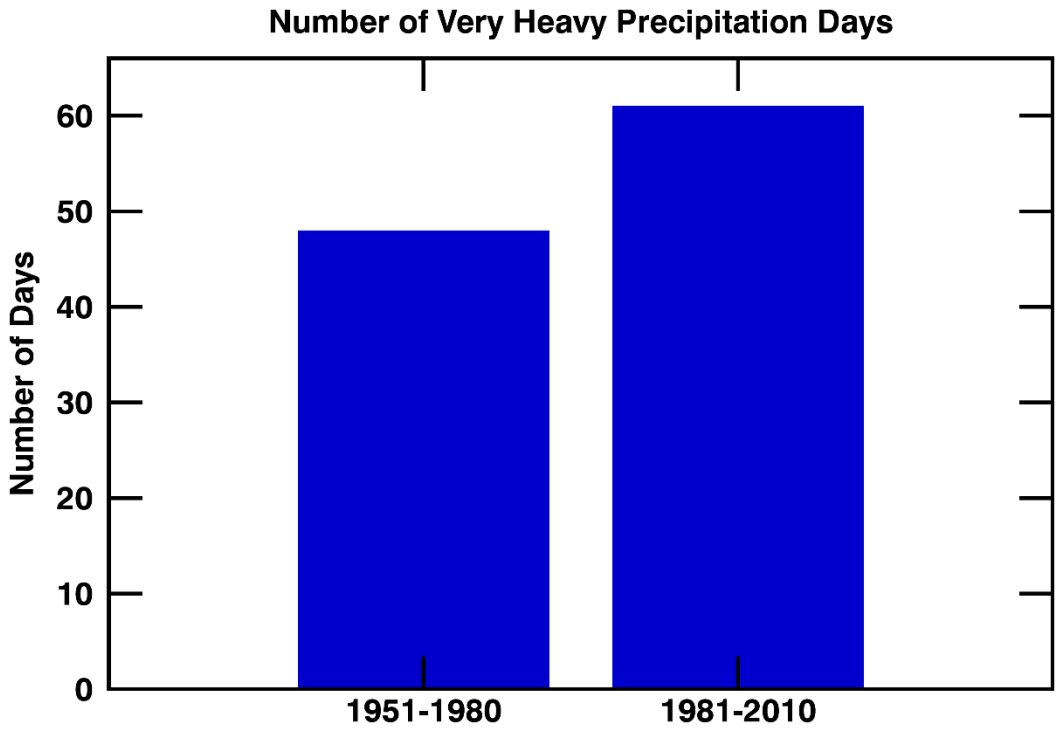
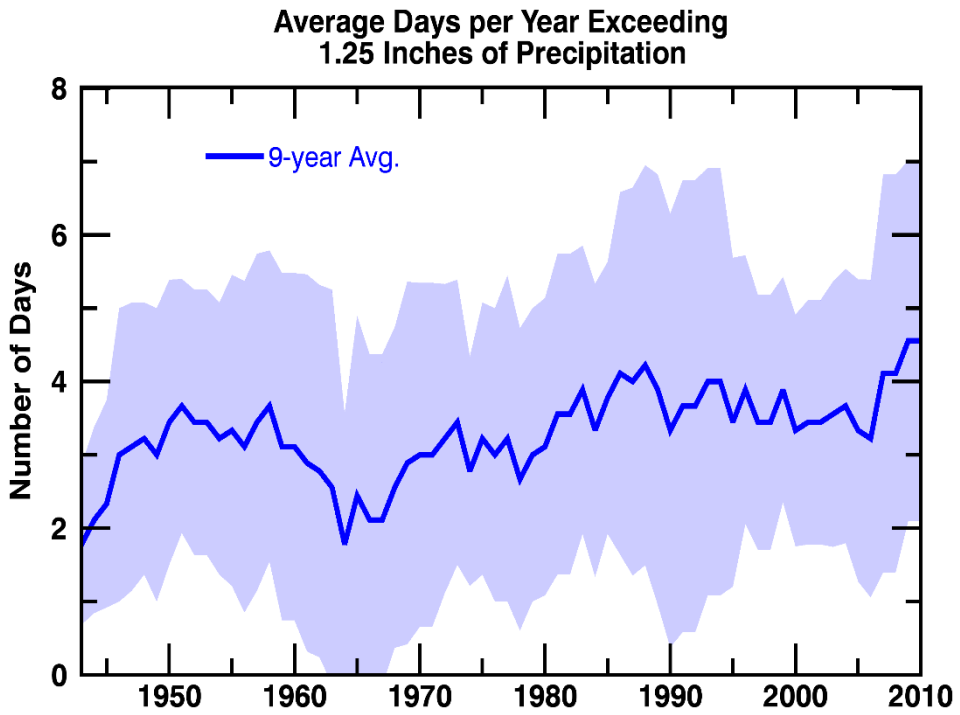
Observed Cleveland Extreme Precipitation





22% in amount falling in heaviest rain events

16% in number of heaviest rain events

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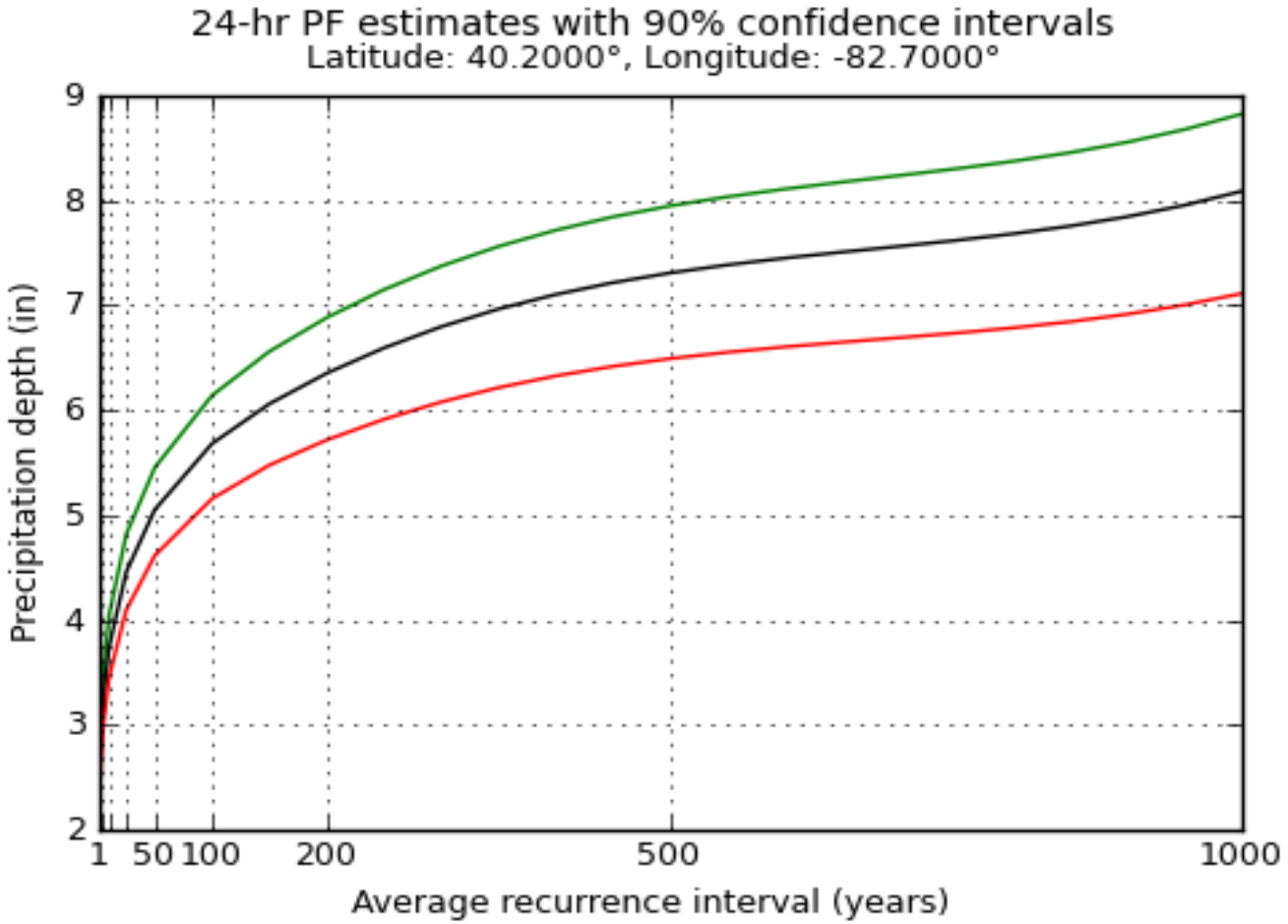
Precipitation Frequency Estimates

Atlas 14



NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Mon Feb 1 19:58:05 2016

Goals and Purpose of Project

- Goals:
  - Identify NE Ohio communities that are most vulnerable to storm hazards
  - Analyze community resilience
- Purpose:
  - Inform local decision making with scientific data
  - Support community development strategies

Credit: News Net 5, Cleveland

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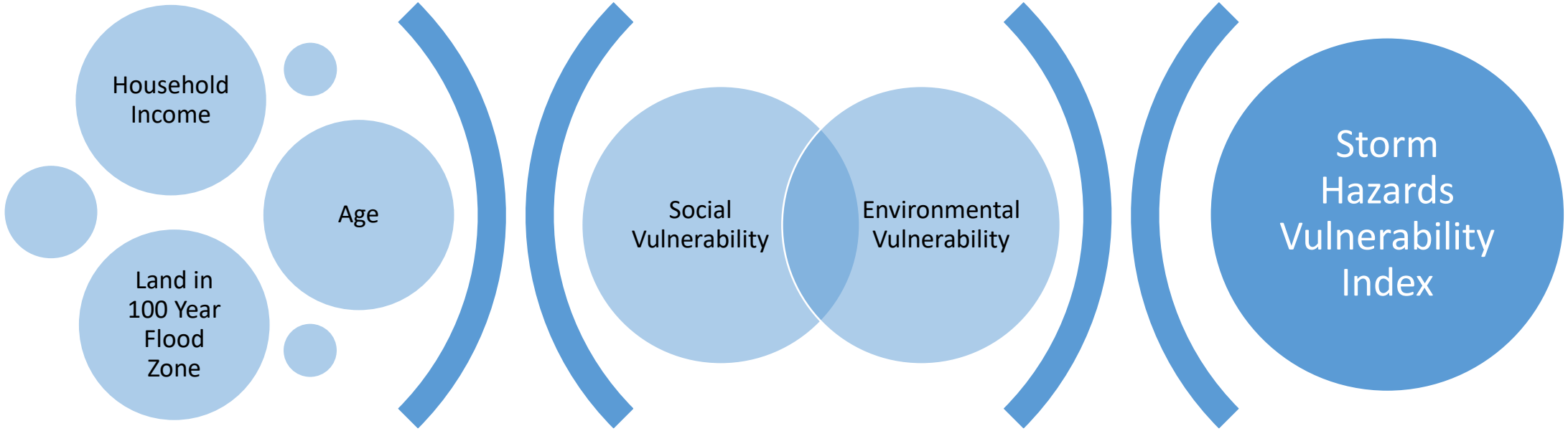
Creating a Storm Hazards Vulnerability Index



Adapted from Messick and Dillard, 2016

Social Vulnerability Indicator

- Measures
  - Age
  - Gender
  - Household income
  - Race/ethnicity
  - Owner-occupied housing

United States Census 2010

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Protecting Your Health and Environment

Social Vulnerability of NE Ohio Communities

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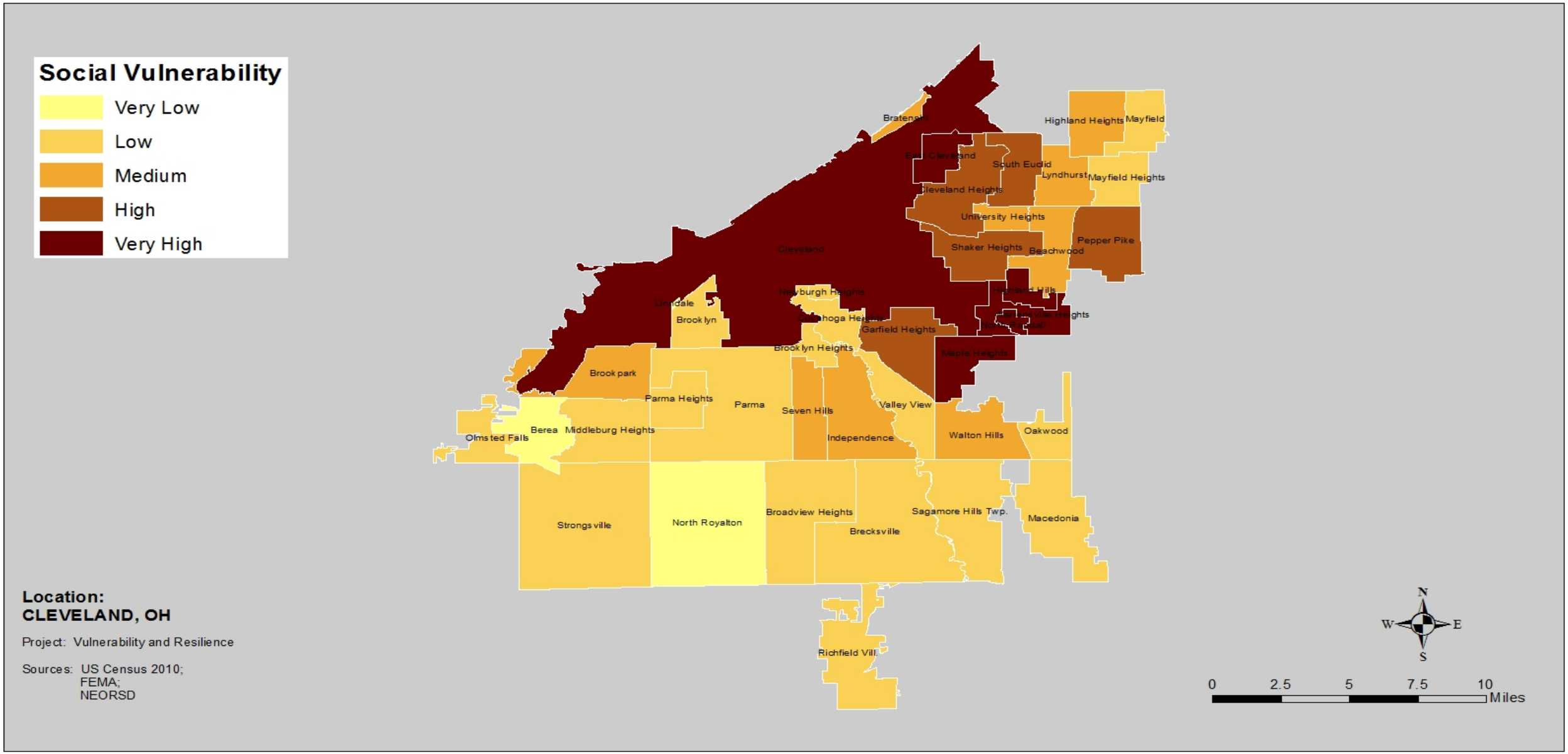

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Environmental Vulnerability Indicator

Credit: NEORSD

- Measures
  - Acres of land in 100yr flood zone
  - Erosion hazards
  - Water quality issues
  - Structural hazards
  - Debris hazards

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Environmental Vulnerability of NE Ohio Communities

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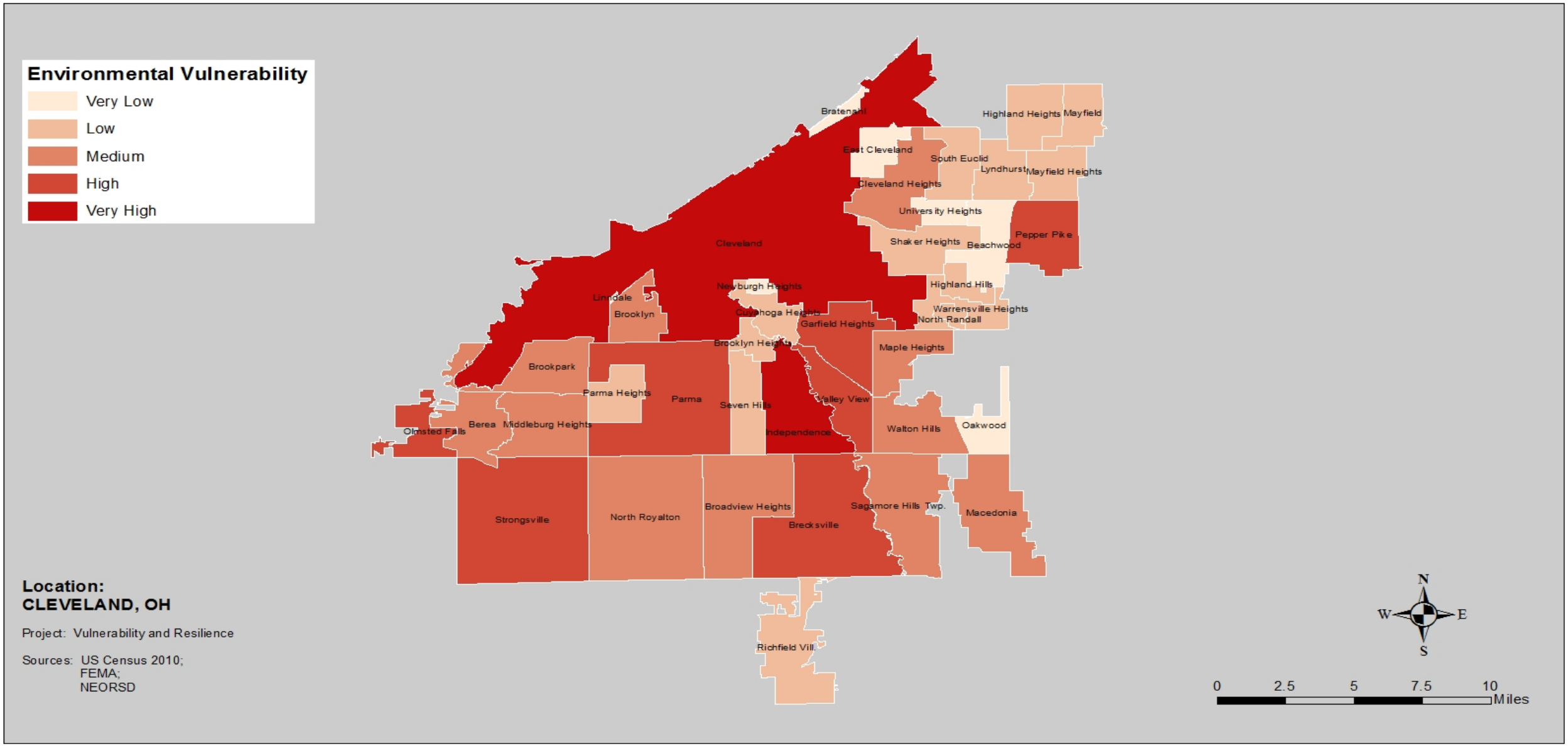

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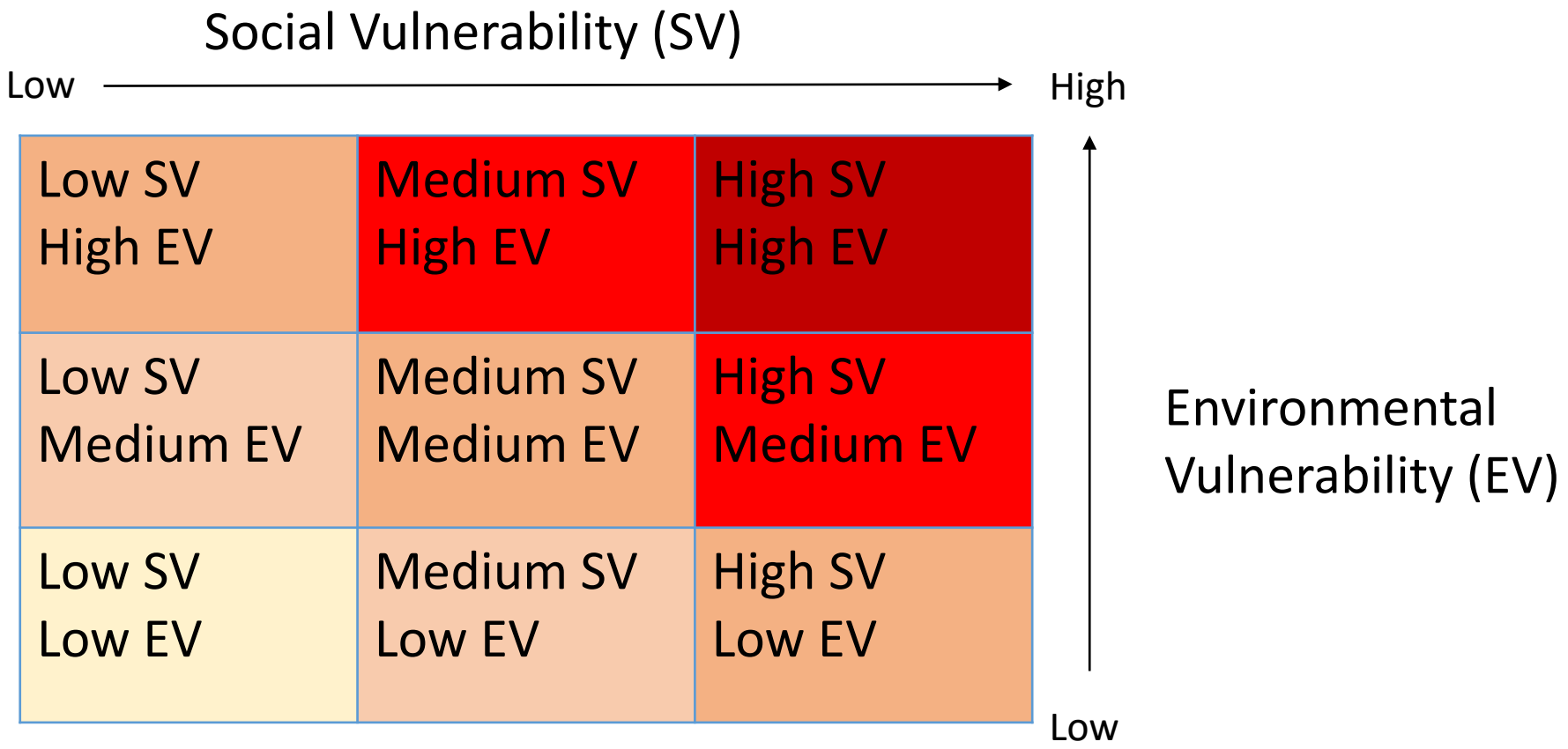
Storm Hazards Vulnerability Index



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Storm Hazards Vulnerability of NE Ohio Communities

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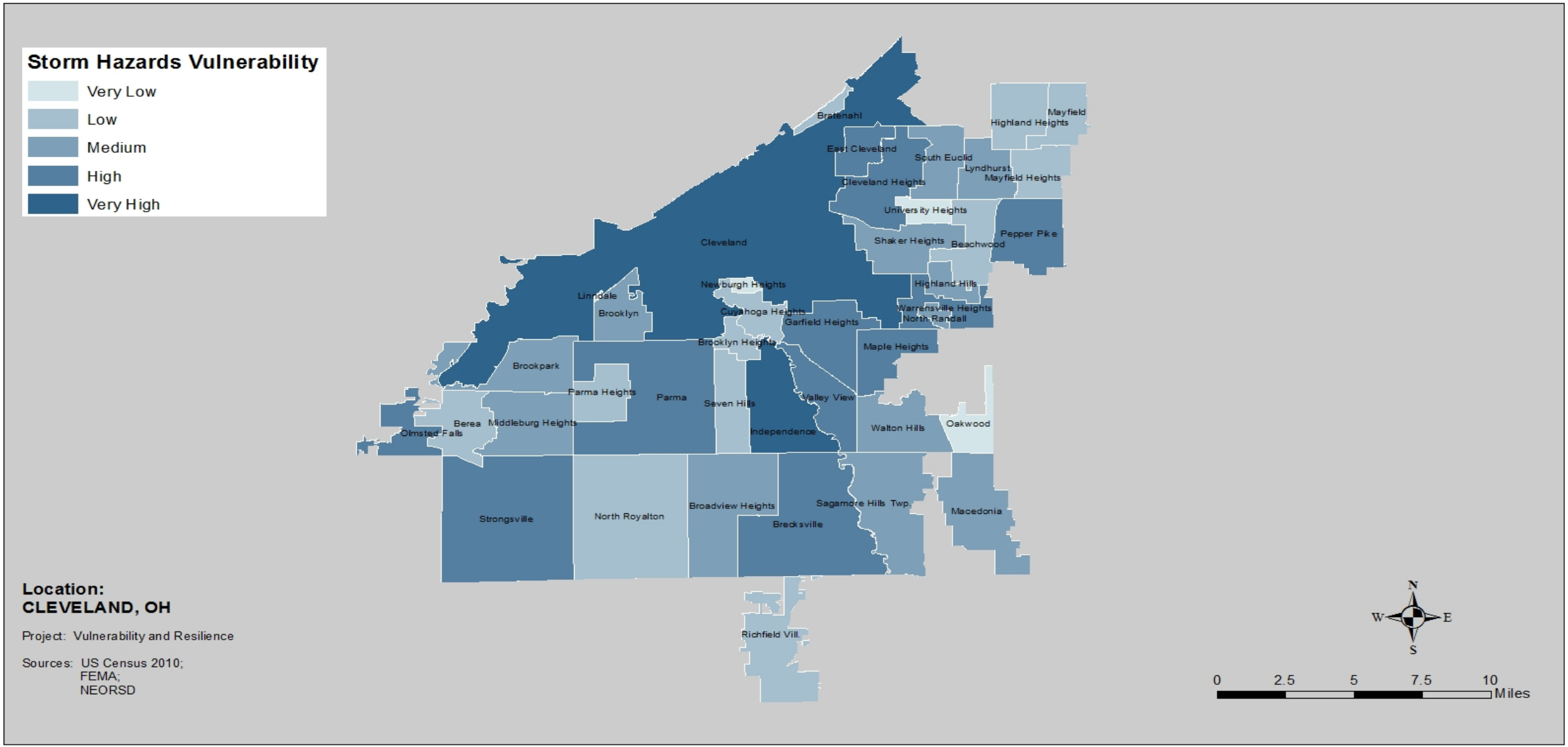

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Project Outputs

- Provide road map for adaptation
  - Identify at risk locations and populations
- Support sustainable decision making
  - Planning, zoning, local codes & ordinances
- Help prioritize best management practices
  - Conservation, green stormwater infrastructure

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Acknowledgements

- NOAA Coastal Storm Program – funding, Atlas 14 data
- NEORSD - data on environmental vulnerability measures, GIS mapping
- ODNR – data on land in 100 year flood zone
- GLISA – observed climate data

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Questions and comments?

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Photo credit: J. Cheston, OSU STEP Project